REMARKS

Claims 1, 5-13, 16-18, and 38-50 remain in the application for further prosecution. It is proposed that Claims 1 and 38 be amended as shown above.

Claims 26 to 37 apparently remain withdrawn from consideration, but they have not been cancelled since the Examiner has not responded to the Applicant's request for reconsideration of the restriction requirement. Clarification is needed.

During a review of the file, it was noticed that the IDS submitted with the previous amendment was not returned. Furthermore, it was noticed that the first page of the IDS mistakenly contained the heading of a related application and not this one. The Form 1449, however, did properly reference the present application. (A copy of the IDS is enclosed) The Applicants request that the enclosed replacement for the first page of the IDS be substituted, so that the IDS can be properly identified in the USPTO files. The Examiner is asked to consider the IDS, if it has not been done. The undersigned apologies for any inconvenience that may have resulted from the error.

Claims 1, 5-13, 16-18, and 38-50 have been rejected again under 35 U.S.C. 102 (b) for the reasons previously stated. The rejection should be withdrawn if the proposed amendment is entered. As amended, Claims 1 and 38 would exclude the use of centrifugal force to overcome a capillary stop. Although centrifugal force is suggested at several places in the specification, it is recognized at page 7, lines 7-14 that other methods could be used. It is a feature of the present invention that liquids are moved by capillary forces alone, without using centrifugal force, except as force is needed to overcome stops that prevent liquids from moving downstream. The Applicants have found that centrifugal force as used by Kellogg and others is needed because it provides the control necessary to move liquids. The larger the capillary is, the lower the force available to move the liquid. Similarly, the resistance of the liquid to applied force is lower. Consequently, centrifugal force provides a way to closely control liquid movement, by adjusting the speed of the disk. If, on the other hand, smaller capillaries are used, larger forces are available to move liquids. It is not necessary to apply centrifugal force, but instead less precise means of applying force are feasible. This means that the equipment needed to apply and control centrifugal force are not needed and that the analysis need not be carried out within a spinning disk. Simpler equipment and microfluidic devices can be used.

It is clear that Kellogg requires the use of disks that are mounted on a centrifuge platform and that the disks are rotated at increasing speeds to move the liquids through the disks. Kellogg's Figs 3A-3J are considered to be the closest to the Applicant's invention. Their operation is discussed at column 12, line 1 to column 13, line 27. Kellogg uses centrifugal force throughout. In Fig 3A a sample of liquid is added to 201 and, as shown in Fig. 3B, with no centrifugal force being applied the liquid migrates only partly into the group of metering capillaries 202 and the overflow capillary 203. In contrast, the Applicant's system only uses capillary action to fill the segment that defines the amount of the liquid sample. Filling the Applicant's segment requires no centrifugal force. Kellogg requires rotating at about 175 rpm to fill the metering capillaries and to empty the inlet well 201 into the overflow chamber 205, as shown in Fig. 3C-D. In contrast, the Applicant's system requires no overflow chamber and does not rely on centrifugal force to fill the metering segment. After the metering capillaries have been filled, Kellogg then increases the rotational speed to 400-500 rpm in order to empty the metering capillaries 202 into chamber 204 and then into holding chamber 207, as shown in Fig. 3E-H. In contrast, the Applicants only have to overcome the resistance of their capillary stop to move the liquid into a reaction chamber, which could, but need not, be done with centrifugal force. As explained above, it is much better to avoid the use of centrifugal force, since that involves complex equipment and disks designed for such use. Also, Kellogg typically shows a sacrificial valve 213 used to prevent liquid from leaving the holding chamber 207. This suggests that the capillary forces available are lower than are typical of the Applicant's device and the resistance to flow is less, so that positive means were provided to be sure that the liquid did not leave the holding chamber while it was being filled. In the alternative mentioned by Kellogg at column 13, lines 1-17, no sacrificial valve is used, but a capillary junction 209 prevents the liquid from flowing into the reaction chamber 210. This resistance is overcome by increasing the rotational speed to 500-800 rpm, as shown in Fig. 3I-J.

In summary, by positively excluding the use of centrifugal force, the Applicants would obviate the Examiner's rejection for anticipation. More than that, Kellogg should not be applied as a reference under 35 U.S.C. 103, since one skilled in the art would not find a suggestion in Kellogg that a microfluidic device was operable without using centrifugal force to control the movement of liquids through the device. In its preferred embodiments now claimed, the Applicant's microfluidic device uses small hydrophilic capillaries that provide higher capillary

forces, enabling liquids to be moved without the application of centrifugal force. When it is desired that the liquid pause in its movement, capillary stops are used. Their resistance is overcome by other than centrifugal force, but force is only needed until the stop has been overcome.

The Examiner is asked to enter the amendment and allow the amended claims. If further amendment is believed to be needed, the Examiner is invited to contact the Applicant's attorney at the telephone number provided below.

Respectfully submitted,

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Date

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